MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 189b
MSDS Number: 189b
SRM Name: Potassium Tetroxalate Dihydrate

Date of Issue: 02 August 2004

MSDS Coordinator: Carmen Davis
Telephone: 301-975-6776
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone Chem Trec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: Standard Reference Material (SRM) 189b is intended for use in preparing solutions for calibrating electrodes for pH measuring systems. SRM 189b meets the specifications of the American Chemical Society for reagent grade material. A unit of SRM 189b consists of a bottle containing 65 g of crystalline material.

Substance: Potassium Tetroxalate Dihydrate

Other Designations: **Potassium Tetroxalate Dihydrate** (potassium salt [2:1] ethanedioic acid dihydrate; potassium salt [2:1] oxalic acid dihydrate; potassium oxalate, dihydrate; potassium tetroxalate dihydrate; potassium quadroxalate; oxalic acid hemipotassium salt; potassium tetroxide)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component: **Potassium Tetroxalate Dihydrate**

CAS Number: 6100-20-5

EC Number (EINECS): Not assigned.

SRM Nominal Concentration: 100 (mass %)

EC Classification: Xn

EC Risk: R21/22

EC Safety: S2, S24/25

EC Risk/Safety Phrases: See Section 15, "Regulatory Information"

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 3 Fire = 1 Reactivity = 0

Major Health Hazards: Mucous membrane burns.

Physical Hazards: Dust/air mixtures may ignite or explode.

Potential Health Effects
Inhalation: Inhalation of steam carrying potassium tetroxalate may cause nosebleeds, excruciating headaches, and vomiting. Delayed effects may include backache, loss of weight, nervousness, anemia, albuminuria, and prostration. Prolonged exposure to fumes containing potassium tetroxalate may lead to renal impairment.

Skin Contact: Chronic exposure to the skin may lead to paresthesia, cyanosis of the fingers, and a pale yellow discoloration of the fingernails.

Eye Contact: No information is available for eye contact.

Ingestion: Soluble salts of oxalic acid may be corrosive to the alimentary tract mucosa. With dilute solutions, gastrointestinal symptoms may be entirely absent. Corrosive lesions may develop in the mouth, pharynx, esophagus, and stomach. Edema of the glottis may occur. Initial symptoms of intoxication include nausea, vomiting, and gastro enteric pain. Vomit and stools may contain blood. Symptoms of oxalate poisoning may include burning sensation in the mouth, throat, esophagus, and stomach, thirst, difficulty swallowing, headache, pain in limbs, numbness, exaggerated reflexes, and a whitish opaque appearance of mucous membranes. Absorption may lead to systemic effects, which may include muscle twitching especially of the face, cramps, weak irregular pulse, lowered blood pressure, slow depressed respiration, irritability, collapse, cerebral edema, and coma. Renal injury symptoms include dilated pupils, which react sluggishly, visual disturbances, stupor, convulsion, and unconsciousness. The estimated mean LD_{50} for oxalates ranges from 15 g to 30 g.

Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
____	X	In the National Toxicology Program (NTP) Report on Carcinogens.
____	X	In the International Agency for Research on Cancer (IARC) Monographs.
____	X	By the Occupational Safety and Health Administration (OSHA).

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing by a qualified personnel. Get immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if necessary.

Eye Contact: Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get immediate medical attention.

Antidote: Calcium gluconate or calcium chloride intravenously. Administer by qualified medical personnel only.

Note to Physician: For ingestion, consider gastric lavage.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Potassium tetroxalate dehydrate is a slight fire hazard. Dust/air mixtures may ignite or explode.

Extinguishing Media: Use regular dry chemical, carbon dioxide, water, or regular foam. For large fires, use regular foam or flood with fine water spray.

Fire Fighting: Move container from fire area if possible without exposure to risk. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point: Not applicable.

Method Used: Not applicable.

Autoignition Temperature: Not applicable.

Flammability Limits in Air
Upper (Volume %): Not applicable.
Lower (Volume %): Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Do not touch spilled material. For small solution spills, absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. For small dry spills, move containers away from spill to a safe area. Keep unnecessary people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8, "Exposure Controls and Personal Protections". Clean up in a manner that avoids dispersing particulates into the air or environments. Place collected spilled material in appropriate container for disposal.

Disposal: See Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Store in its original container with the cap tightly closed, under normal laboratory conditions of temperature and humidity. Do **NOT** store in a desiccator.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: No occupational limits established.

Ventilation: Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: For conditions of frequent use or heavy exposure where exposure is apparent and engineering controls are not feasible, respirator protection may be needed. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory. An eye wash station should be readily available near areas of use.

Personal Protections: Wear appropriate chemical resistant clothing to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: **Potassium Tetroxalate Dihydrate**

Appearance: Colorless to white crystals.

Molecular Weight: 254.19 g/mol

Molecular Formula: $KH_3(C_2O_4)_2 \cdot 2H_2O$

Density: 1.836 g/cm^3

Solvent Solubility: Slightly soluble in alcohol.

Water Solubility: Soluble.

Boiling Point: Not applicable.

Melting Point: Decomposes.

10. STABILITY AND REACTIVITY

Stability: _X_ Stable ____ Unstable
Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid hear, flames, sparks, and other sources of ignition.

Incompatible Materials: Oxidizing materials.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition may release miscellaneous decomposition products.

Hazardous Polymerization: ___ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data: The estimated mean LD_{50} for oxalates ranges from 15 g to 30 g.

Target Organs: Kidneys.

Medical Conditions Aggravated by Exposure: Heart or cardiovascular disorders.

Health Effects (Acute and Chronic): See Section 3, "Hazards Identification".

12. ECOLOGICAL INFORMATION

Adverse Effects: Not available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: No classification assigned.

Canadian Transportation of Dangerous Goods: No classification assigned.

15. REGULATORY INFORMATION

U.S. Regulations: CERCLA Sections 102a/103: Not regulated.

SARA Title III Sections 302 (40 CFR 355.30), 304 (40 CFR 355.40), and 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

California Proposition 65: Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):
ACUTE: Yes.
CHRONIC: Yes.
FIRE: No.
REACTIVE: No.
SUDDEN RELEASE: No.

CANADIAN Regulations: WHMIS Classification: Not determined.

EC Classification: Xn Harmful

EC Risk and Safety Phrases:

R21/22	Harmful in contact with skin and if swallowed.
S2	Keep out of reach of children.
S24/25	Avoid contact with skin and eyes.

Concentration Limits: Concentration ≥ 5 %: Xn, R21/22

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Potassium Tetroxalate,* 19 March 2003.
SRM 189b; *Potassium Tetroxalate Dihydrate, pH Standard*; National Institute of Standards and Technology, U.S. Department of Commerce: Gaithersburg, MD (2000).

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.